RUST AND MILDEW UPON WHEAT HURTS PRODUCTION

Effort Being Made to Produce a Plant Which Is Immune to Disease—By Prof. D. Finlayson, Eminent English Agricultural Scientist.

The innumerable species of microscopic fungi which are in many instances so destructive to the life and vigor of many farm and garden crops, are diverse in structure and habit and of much importance. Though differing in their mode of life and the amount of damage they may do to particular crops, the species agree in the absence of the beautiful green coloring so universal in the higher order of plants.

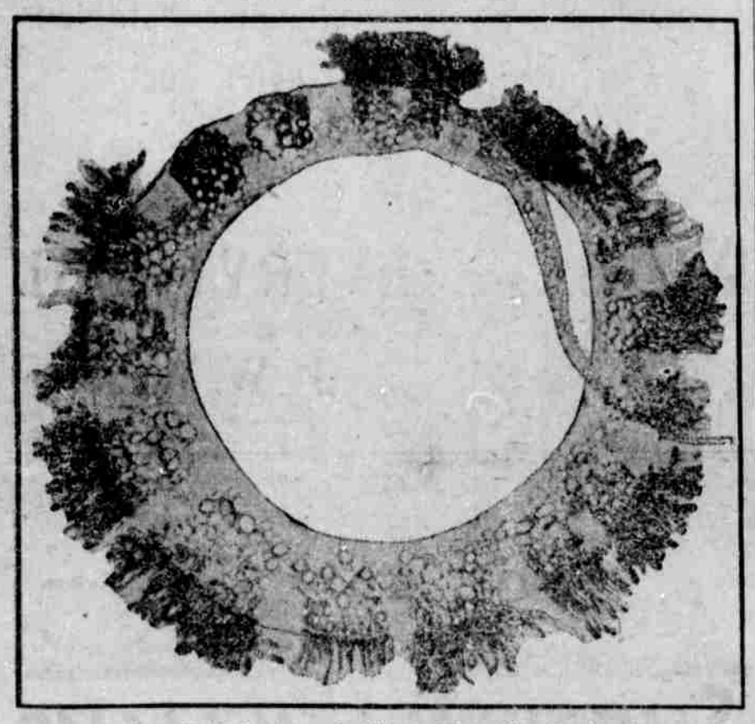
The physiological peculiarities whereby the growth becomes parasitic or saprophytic are entirely dependent upon the inability to manufacture and elaborate the foodstuffs required. In ordinary plants the green cells, particularly those of the leaves, may in a sense be likened to a manufactory or chemical laboratory where the various complex vital processes concerned in the elaboration of the foodstuff and the nutrition of the plant are carried on. In the green cells, under the energising action of sunlight, starch and other more complex compounds are formed from the elements of carbon-dioxide from the atmosphere in conjunction with water, bearing in solution mineral matter from the soil. Plants destitute of the green coloring matter (cholrophyll), such as the fungi, not being in a position to manufacture the food necessary, obtain a livelihood in one or other of two ways. One class of fungi lives upon the decaying remains of plants and animals and are known as "saprophytes;" the other, parasitic fungi, rob the living plant of prepared food materials, which would otherwise be used to maintain and increase its vigor, and in the ultimate

Good Grains.

spring. These last-mentioned spores are thick-walled two-celled bodies club-like or spindle-shaped. When germination takes place in the spring the germ tube is protruded from each cell, which grows until its length is two or three times the length of the original spore; partitions are then formed across the tube, dividing it into three or four segments, each segment becomes branched and produces at its apex small spore-like bodies known as sporidae. This sporidae in its turn carries on the disease another stage. In the life history of the disease, which has manifested itself so differently, both as rust and mildew on the same plant, we have reached a stage which was for a long time beset with difficulty and disappointment. Many experiments were made to infect plants direct by means of teleuto spores or by sporidae, either through the root, leaf or other surface, but without success. This was the condition of affairs when the late Prof. de Bary took the matter up, and after numerous painstaking observations established the connection between the cluster-cup or aecidum disease on the leaf of the barberry and mildew, the former (the cluster-cup disease) being sumply an earlier form of mildew, living its life on another host plant and preceding the rust disease of wheat. De Bary discovered that practically at will he could produce the barberry disease by sowing the teleuto spores of wheat in the spring on a barberry leaf, and further, by sowing aecidio spores of the barberry on the young leaves of the wheat the presence of rust, and ultimately mildew, was a foregone conclusion.

Though there are no direct remedies for rust, clean cultivation, the burning of infected straw, which carries the resting spores of the disease over the winter, may aid considerably in the mitigation of the evil.

The difficulty that has to be met and surmounted is the blending together in one ear or grain, rust resistance from one type, strength from another, yield and, perhaps early maturity from yet another, and when the plant-breeder has realized his desires after years of research and experimenting, in all probability the new type he has evolved will be suitable only for growth and ability to maintain its character under similar conditions to that in which it was originated. Rust-resistant wheat grown in Australia became badly rusted when grown in America, and vice versa. It has been stated by more than one authority that the injury done by rust to cereal crops exceeds $100,000,000 per annum. The department of agriculture has put on record: "The damage to wheat and oats from rust in this country probably exceeds that caused by any other fungus or insect pest, and, in some localities, is greater than that caused by all other enemies combined."



Magnified Section of Wheat Stem, Showing Rust.

Shrivelled Grains from Rusted Ear.

production and development of healthy well-formed seeds.

In examining a growing crop of rusted wheat during the present year, the writer paid especial attention to the gradual transition from the rusted to the mildewed stage. Towards the end of July the plants under observation were badly rusted, the color of the spots and pustules on the leaves being a bright orange color; this darkened as the corn ripened, until ultimately the spots were dark brown, and the spores produced from the same mycelia which gave rise to the rust spore of the summer, turned out to be not the rust spores of the uredo stage, but the teleuto spores of wheat mildew. This proved the view held by some of the most famous biologists after repeated experiments that the disease so long known as wheat mildew (Puccinea graminus) was less than the autumnal form of the uredo or rust. The teleuto spores, so-called, as they are formed late or last in the life history of the fungus, are the winter or resting spores of the disease. When these spores are placed under conditions favorable to germination they do not grow rapidly as do the uredo spores; in fact, it has been found practically impossible to make the teleuto spores grow without a period of rest, growth taking place only in the late winter or early

The Wise Poultryman.—It is the wise poultryman who breeds from his best winter layers.

FIRE BLIGHT OF APPLES TROUBLING ORCHARDISTS

Serious Disease Which Attacks the Trees at Blooming Time—Observations Made by New Jersey Experiment Station.

The attention of the New Jersey experiment station was, in the spring of 1906, called to a serious disease of apples, which baffled many growers. On examination of specimens sent to the writer the disease was at once recognized to be due to the same organism which causes the fire-blight of the pear.

The writer visited orchards in the vicinity of Dover and Wyoming to study the appearance of the disease. At the time of the examination in late May dead clusters of leaves were seen in all parts of the tree, and at first glance gave the impression that the trees had been touched by frost. Judging from this appearance and the fact that quite a heavy frost had occurred a few days previous, many growers were convinced that their trees were suffering from the effects of frost.

A close examination, however, revealed the fact that it was not the tips of the branches that were dead, as would have been the case had the trees been affected by frost, but the leaves of the fruit spurs. It was also noteworthy that in many cases only certain leaves of the fruit spur were dead, while others were living. In nearly all cases examined the shriveled remains of a young fruit which had not developed at all, or but slightly, was found and that it was the leaves in the bud from which this young apple emerged that were brown and dead.

It has been suggested that these germs of fire blight are, under proper conditions, carried by bees and other insects at blossoming time, and that through this agency the blossoms may become infected.

While the observations were made too late in the season to procure any data as to the blossom infection the evidence all points to the conclusion that infection of this kind occurred generally in Delaware in 1906.

The blossoms were apparently inoculated, and the disease obtained a foothold in the young fruit, perhaps carried into the tissue by the growth of the pollen into the stigmatic surface of the pistil. The organisms proceeded very slowly down the peduncle of the blossom, and into the fruit spur cutting off nourishment from the young fruit, and causing it to shrivel and die. The leaves of the spur immediately surrounding the base of the infected apple were also cut off from nourishment by the growth of the organisms and also killed. This occurred about two or three weeks after the blossoming time or long enough for the organisms to make their way down the peduncle of the flower and into the spur.

The evidence is made more conclusive from the fact that, in cases where other blossoms in the same spur did not become infected, the young apples continued to develop and reached a diameter of one-half to three-fourths of an inch by the time the organisms starting from another blossom of the same bud had reached the spur. In some cases the disease was thrown off and the apples continued to develop. In other (See plate Fig. 1 and 2), cases the organisms, after reaching the spur, continued up the peduncle of these partly grown apples. Some were completely rotted at time of inspection, in others the organisms had only reached part way up the peduncles.

On examination, the juices of young apples infected through the peduncle in this way was found to be full of the organisms of the disease. Cultures were made from these apples and pear twigs successfully inoculated.

Cases of Fire Blight on Apple Twigs.

A SMALL LIME KILN

The Lime Kiln. A, Ashpit; B, Flagstones for Grate; C, Fire Hole.

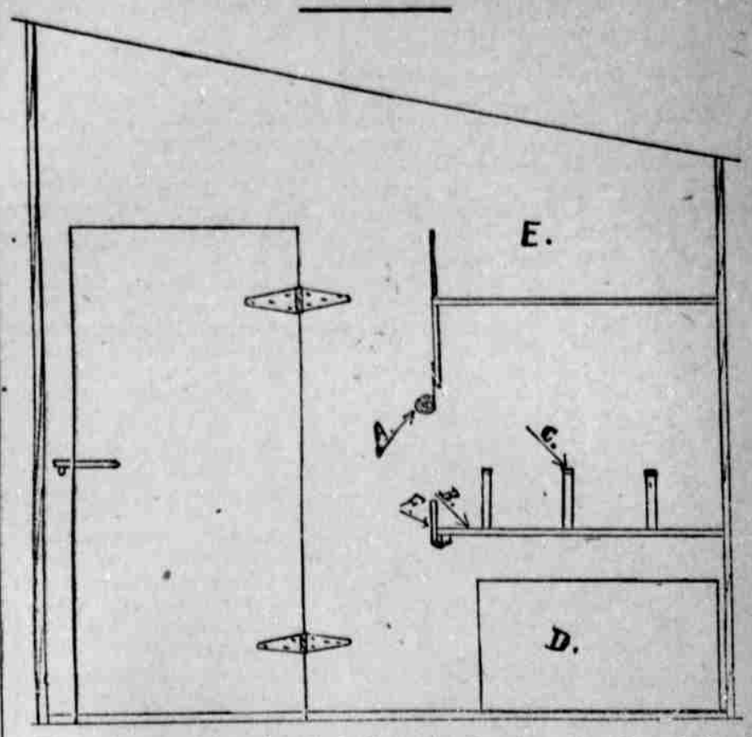
For a temporary lime kiln excavate into the side of a bank large enough for the size kiln required. At the bottom of the kiln there should be an ash pit 16 or 18 inches deep; on top of this flagstones should be placed three or four inches apart; these stones answer for a grate and the space between the stones allows the ashes to drop through into the ash pit. The fire hole should be stoned up three feet high then corbelled in until the stones meet (see plan). By standing up pieces of boards or planks around the outside of kiln, filling the kiln with stone and puddling in clay between the board and bank at the same time, the stone will hold the boards from crushing in, and when the kiln is burned and the lime removed the sides of the kiln will be like one solid brick and will last for several burnings. It usually requires about 72 hours to burn an ordinary kiln.

Cherry Trees and Their Blossoms.—The Japanese and the Chinese make more out of the cherry than we do. In Japan there are varieties that are grown for their flowers alone. In cherry blossom time picnics are held under the cherry trees and verses are written about the beauties of nature

To Stop Chicken Eating.—To break a hog of eating chickens put a ring in each ear and to those rings hang an old boot leg, letting it fall down over the eyes. Then put two of three rings in the nose. This seldom fails, but in case of failure give him a ride on the cars

CHEAP AND COMFORTABLE HOUSE FOR THE POULTRY

By J. Wesley Griffin, Kentucky.



This arrangement can be attached to any sized house. Be sure that all cracks are stopped around the roosting room.

A.—Is a curtain of heavy muslin hung on a roller, to be let down after the fowls have gone to roost. This curtain should not be raised of a morning until the feed and water is distributed, then when it is raised all the fowls have an equal chance at the feed.

B.—Is the dropping board, which should be made of tongue and grooved lumber.

C.—The roosts. They should be eight inches above the dropping board, so the droppings may be raked out with ease.

D.—The nest boxes; they may be made of boxes secured at the grocery with a part of one end and the top taken off.

E.—Is a place to store dry leaves or cut straw for the scratching shed.

F.—A board about four inches broad, hung on hinges so as to let down while cleaning out the droppings.

Windows for light and ventilation should be in front.

A scratching shed at the end ten feet square for 30 fowls—Farmers' Review.

DOES THE HOME GARDEN PAY?

Surely if the busy city man whose business keeps him in the city all day, so that the garden plot must be worked before breakfast and after supper, can answer yes to the question propounded above, then the farmer, with his more favorable opportunity and greater facilities of planting and cultivating, can answer yes, too. And yet it seems necessary to keep constantly preaching the utility and comfort of the garden patch on the farm, for there are yet many farmers who are denying themselves and their families the blessing of the home grown vegetables and fruits. But why should they when so little extra effort of time and thought will supply their tables with the wholesome good things? Many a farmer might profitably observe what some city men with gardening proclivities are accomplishing on back yard plots with simple implements and scant time.

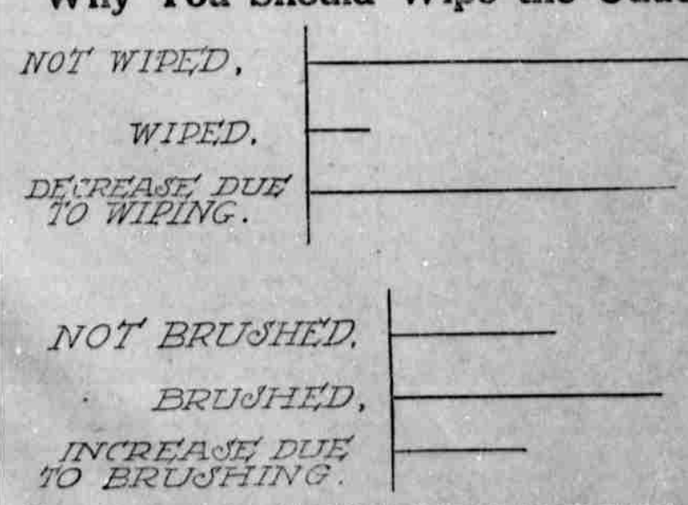
Here is what one industrious resident of Morgan Park, a town adjacent to Chicago, accomplished in the gardening line last summer. What farmer is there who with the horses and tools at his command could not duplicate this man's harvest without one-half the expenditure of time or labor? From early spring this city man's garden supplied a family of six with an abundance of vegetables, and there was always a goodly surplus with which to gladden the hearts of neighbors and friends. By successive sowings the crop of radishes was continuous from April to October. Tomatoes and peppers were started February 15 in the man's basement, and later set out in their permanent locations when the weather had become warm enough. Cauliflower was started in the same way.

In the garden were to be found the regular yellow turnip, and the small yellow turnip, a new variety. The Japanese climbing cucumber was raised because of the economy of space which it made possible over the common ground variety. There was an abundance of sweet corn of the Peep o' Day variety; its strong points being early maturity, besides being sweet and tender. The hubbard squash was highly successful, a goodly store being harvested for winter use. Three kinds of beans were grown, two being of the lima variety. And besides the foregoing the garden produced an abundance of carrots, onions, parsnips, celery, cabbage, beets, wax beans, kohl rabi, spinach and rhubarb. All the work in the garden was done by the man himself, even to the spading of the plot in the spring, and every morning found him up before sunrise and busy amidst his plants and shrubs, and every night after the day's work was done found him in the same place. This fall this man, who is looking forward to even a better season next year, has made several cold frames, in which he will be able to start his seed earlier and get strong vigorous plants by the time the weather is settled to permit transplanting in the open ground. And what this city man has done any farmer can more easily do. Plan for the garden plot next season. Wife will be happy and she and the rest of the family will give you place among the true philanthropists.

Natural Weaning.—I never wean pigs. When they begin smelling around the trough at feeding time I put a low trough where they can get at it and the mothers cannot, then keep in it a slop of middlings, ground oats and sweet skimmilk. In six or seven weeks they forget their mothers and grow right along.

The Duck Trough.—The ducks' drinking trough should have slats nailed across the top four or five inches apart to prevent them from getting into it with their feet, and making the water filthy.

Why You Should Wipe the Udder



The moistening of the udder with a damp cloth or sponge before milking is one of the best means of preventing dirt from falling into the pail. In tests that have been made with milk drawn from cows that have had the udder dampened and with milk drawn under ordinary conditions the difference in the number of bacteria was in the proportion shown in the accompanying diagram. Brushing the udder and side of the cow does not serve the same purpose, as it simply stirs up the dirt and dust and leaves it floating in a position to settle readily into the pail. The result is an increase of bacteria in the milk, as indicated in the diagram.